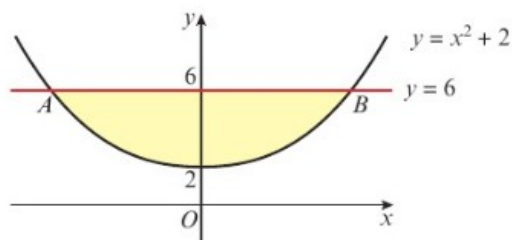


**Exercise 13G**

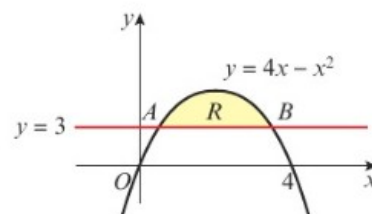
- 1 The diagram shows part of the curve with equation  $y = x^2 + 2$  and the line with equation  $y = 6$ . The line cuts the curve at the points  $A$  and  $B$ .

- Find the coordinates of the points  $A$  and  $B$ .
- Find the area of the finite region bounded by line  $AB$  and the curve.



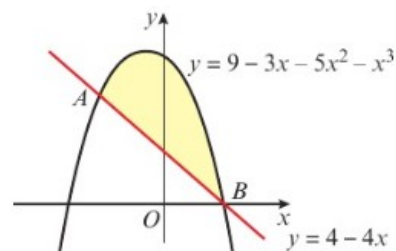
- 2 The diagram shows the finite region,  $R$ , bounded by the curve with equation  $y = 4x - x^2$  and the line  $y = 3$ . The line cuts the curve at the points  $A$  and  $B$ .

- Find the coordinates of the points  $A$  and  $B$ .
- Find the area of  $R$ .



- 3 The diagram shows a sketch of part of the curve with equation  $y = 9 - 3x - 5x^2 - x^3$  and the line with equation  $y = 4 - 4x$ . The line cuts the curve at the points  $A(-1, 8)$  and  $B(1, 0)$ .

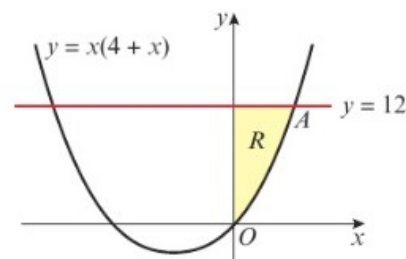
Find the area of the shaded region between  $AB$  and the curve.



- 4 Find the area of the finite region bounded by the curve with equation  $y = (1 - x)(x + 3)$  and the line  $y = x + 3$ .

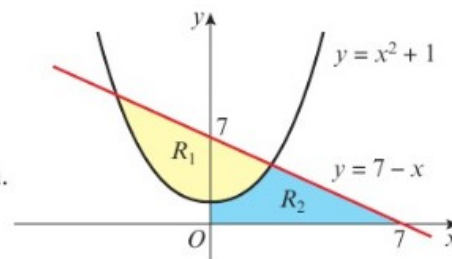
- 5 The diagram shows the finite region,  $R$ , bounded by the curve with equation  $y = x(4 + x)$ , the line with equation  $y = 12$  and the  $y$ -axis.

- Find the coordinates of the point  $A$  where the line meets the curve.
- Find the area of  $R$ .



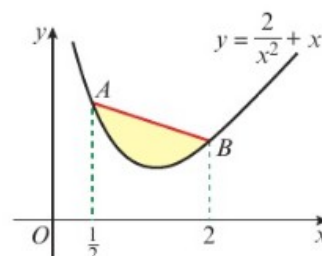
- 6 The diagram shows a sketch of part of the curve with equation  $y = x^2 + 1$  and the line with equation  $y = 7 - x$ . The finite region,  $R_1$ , is bounded by the line and the curve. The finite region,  $R_2$ , is below the curve and the line and is bounded by the positive  $x$ - and  $y$ -axes as shown in the diagram.

- Find the area of  $R_1$ .
- Find the area of  $R_2$ .

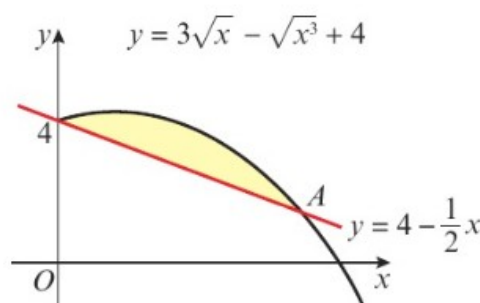


- P 7** The curve  $C$  has equation  $y = x^{\frac{2}{3}} - \frac{2}{x^{\frac{1}{3}}} + 1$ .
- Verify that  $C$  crosses the  $x$ -axis at the point  $(1, 0)$ .
  - Show that the point  $A(8, 4)$  also lies on  $C$ .
  - The point  $B$  is  $(4, 0)$ . Find the equation of the line through  $AB$ .  
The finite region  $R$  is bounded by  $C$ ,  $AB$  and the positive  $x$ -axis.
  - Find the area of  $R$ .

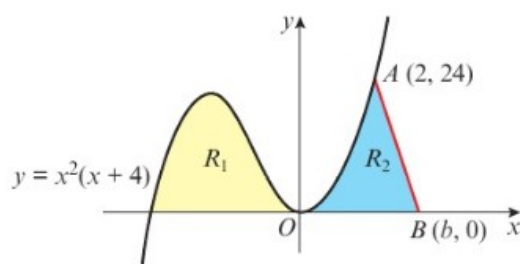
- P 8** The diagram shows part of a sketch of the curve with equation  $y = \frac{2}{x^2} + x$ . The points  $A$  and  $B$  have  $x$ -coordinates  $\frac{1}{2}$  and  $2$  respectively.
- Find the area of the finite region between  $AB$  and the curve.



- P 9** The diagram shows part of the curve with equation  $y = 3\sqrt{x} - \sqrt{x^3} + 4$  and the line with equation  $y = 4 - \frac{1}{2}x$ .
- Verify that the line and the curve cross at the point  $A(4, 2)$ .
  - Find the area of the finite region bounded by the curve and the line.



- P 10** The sketch shows part of the curve with equation  $y = x^2(x + 4)$ . The finite region  $R_1$  is bounded by the curve and the negative  $x$ -axis. The finite region  $R_2$  is bounded by the curve, the positive  $x$ -axis and  $AB$ , where  $A(2, 24)$  and  $B(b, 0)$ .
- The area of  $R_1$  = the area of  $R_2$ .
- Find the area of  $R_1$ .
  - Find the value of  $b$ .



### Problem-solving

Split  $R_2$  into two areas by drawing a vertical line at  $x = 2$ .

- E/P 11** The line with equation  $y = 10 - x$  cuts the curve with equation  $y = 2x^2 - 5x + 4$  at the points  $A$  and  $B$ , as shown.
- Find the coordinates of  $A$  and the coordinates of  $B$ . **(5 marks)**
- The shaded region  $R$  is bounded by the line and the curve as shown.
- Find the exact area of  $R$ . **(6 marks)**

